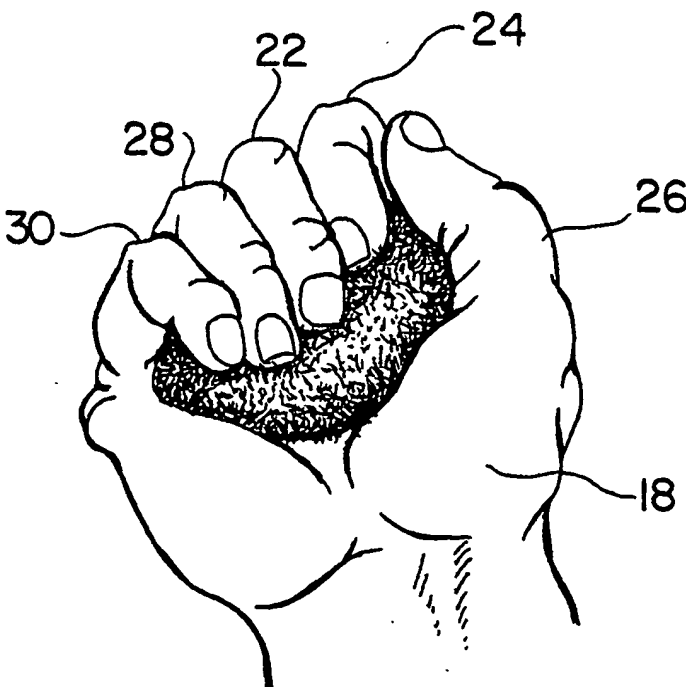




## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<p>(21) International Application Number: PCT/US90/03815</p> <p>(22) International Filing Date: 5 July 1990 (05.07.90)</p> <p>(30) Priority data: 376,858 6 July 1989 (06.07.89) US</p> <p>(71)(72) Applicant and Inventor: DAVIS, J., Mark [US/US]; P.O. Box 1159, Alabaster, AL 35007 (US).</p> <p>(74) Agent: HINSON, James, B.; Suite 222-B, 3126 Milton Road, Charlotte, NC 28215 (US).</p> <p>(81) Designated States: AT (European patent), AU, BE (European patent), CA, CH (European patent), DE (European patent)*, DK (European patent), ES (European patent), FR (European patent), GB (European patent), IT (European patent), JP, LU (European patent), NL (European patent), SE (European patent).</p>		<p>Published</p> <p><i>With international search report.</i></p> <p><i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i></p>
<p>(54) Title: EXERCISE DEVICE</p> <p>(57) Abstract</p> <p>An exercise device for the hands. More specifically the device comprises a resilient "egg shaped" body (10) adapted for squeezing with the fingers (22, 24, 28, 30), to exercise the hand (18). Flocking (36) may be applied to the exterior surface of the body (10) to improve its appearance and feel.</p> 		

\* See back of page

### DESIGNATIONS OF "DE"

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Exercise Device

BACKGROUND OF THE INVENTION

Field of the Invention

The invention relates to exercise devices and more specifically to an exercise device for the hand and arms.

DESCRIPTION OF THE PRIOR ART

Various prior art devices are available for exercising the muscles of the hand and arm. Such devices range from spring operated squeeze devices to various shaped bodies of elastic materials. For example, tennis balls have been used as hand exercise devices. The effectiveness and ease of use of such prior art devices is determined by the extent to which such devices complement the natural shape and function of the hand.

For example, tennis balls have the characteristics that the spherical outer surface does not complement the natural form of the hand. As a result, the little and first finger contact the surface at an angle tending to cause these fingers to slip as the ball is squeezed.

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03 Additionally, it is desirable that exercise devices of  
04 this type be easy to carry so they may be utilized during  
05 spare moments which might otherwise be wasted.

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07 Factors which must be considered in selecting an exercise  
08 device which complements the human hand include the  
09 structural complexity of the hand and the associated  
10 muscles. If the exercise device is to be squeezed, it is  
11 preferable that the device permit the fingers of the hand  
12 to be positioned in their natural position. This requires  
13 that each of the fingers be closed (curved) by  
14 substantially the same amount. Additionally, it is  
15 preferable that the thumb not or unreasonably interfere  
16 with the fingers. Surface treatments, such as flocking,  
17 may be utilized to produce outer surfaces having the  
18 desired physical and aesthetic properties.

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#### SUMMARY OF THE INVENTION

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22 The exercise device which is the subject of this  
23 invention complements the natural contours of the human  
24 hand and provides an effective mode of exercise.  
25 Additionally, the exercise device is easy to transport.  
26 For example, the exercise device may be carried in the  
27 pockets of men's trousers or in ladies' purses.

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29 The preferred embodiment of the invention comprises a  
30 body of elastic material, such as foam rubber, having a  
31 curved outer surface. The curved outer surface has a  
32 curvature which compliments the structure of the human

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03 hand. More specifically, the body of material is  
04 generally "egg-shaped" with the larger end portion  
05 complementing the thumb portion of the hand while the  
06 smaller portion complements the remainder of the human  
07 hand.

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09 More specifically, a first embodiment of the invention  
10 includes a body of elastic material including a  
11 selectively curved outer surface and having a major axis  
12 and a minor axis; the major axis coincides with the  
13 maximum cross-sectional diameter of the body of elastic  
14 material, the minor axis coincides with the maximum  
15 cross-sectional diameter of the body of material in a  
16 plane perpendicular to the major axis; the body  
17 includes first and second portions defined by a plane  
18 passing through the minor axis and perpendicular to the  
19 major axis; the outer curved surface of said first  
20 portion having a selectively varying curvature with the  
21 maximum curvature corresponding to a region adjacent to  
22 the major axis; the outer surface of said second portion  
23 having a selectively varying curvature with the maximum  
24 curvature corresponding to a region adjacent the major  
25 axis; the maximum curvature of said first and second  
26 portions being different. Generically, this results in a  
27 generally "egg shaped device".

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29 The exercise device can be constructed in various sizes  
30 with the relative dimensions adjusted for differences in  
31 the human hand. Best results are normally achieved when  
32 the dimensions are selected such that a line passing

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03 through the tips of the first and little finger is  
04 substantially parallel the major axis of the device with  
05 the tips of the second and ring finger spaced from the  
06 palm of the hand. Additionally, all fingers should extend  
07 around the device a distance equal to more than one half  
08 the circumference of the device.

09

10 Alternatively the invention may be described as a body of  
11 elastic material which includes a curved outer surface,  
12 symmetrical about its major axis and asymmetrical about  
13 its minor axis; the body including first and second  
14 generally dome-shaped portions defined by a plane passing  
15 through the minor axis and perpendicular to the major  
16 axis; selected regions of the outer curved surface of  
17 the first and second portions are being selectively  
18 contoured thereby rendering the body asymmetrical about  
19 the minor axis.

20

21 The above embodiments of the invention, illustrate the  
22 salient structural characteristics of the invention.  
23 Each of these illustrative embodiments include a central  
24 portion having a larger circumference than the  
25 differently contoured curved end portions. The central  
26 and end portions may be individually contoured to  
27 complement different portions of the hand. Additionally  
28 the contoured outer surface complements the natural form  
29 of the human hand, as subsequently described in detail.

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## DESCRIPTION OF THE DRAWINGS

Figure 1 is an isometric drawing illustrating the invention.

Figure 2 is a pictorial drawing illustrating the use of the invention.

Figure 3 is a cross-sectional view of the device along a plane parallel to the major axis.

## DETAILED DESCRIPTION

Figure 1 is a pictorial drawing illustrating the preferred embodiment of the invention. This embodiment includes a body of elastic material 10 which has an outer curved surface which is generally "egg-shaped". As with all bodies of this general shape, the body includes a major axis 12 which coincides with the maximum cross-sectional diameter of the body. Similarly, a minor axis 14 corresponds to the maximum cross-sectional diameter in a plane perpendicular to the major axis 12. Generically, the body of elastic material 10 can be accurately described as "egg shaped". Experiments have demonstrated and the drawings illustrate that this shape complements the natural form of the closed human hand, as subsequently described in detail.

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03 Alternatively, the body of elastic material 10 may be  
04 described as an elongated body symmetrical about its  
05 major axis and asymmetrical about its minor 14 axis. As  
06 discussed below and illustrated in Figure 2, the end  
07 portions of the body of material 10 adjacent the major  
08 axis has little contact with the hand during use. This  
09 permits these regions to have any reasonable contour. In  
10 the most general case, the end portions of the preferred  
11 embodiment can be accurately described as "dome shaped".  
12 However, if desired, more complex surfaces may be used,  
13 For example, a groove could be included to complement  
14 the fingers or the thumb. Such complicated structures,  
15 while feasible, are not believed to functionally improve  
16 the device sufficiently to justify the increased  
17 complexity.

18

19 Alternatively, the central and end portions may be  
20 contoured individually to complement the different  
21 portions of the hand. In such a case, the device is not  
22 necessarily symmetrical about the major axis. While  
23 functional, the preferred embodiments of the invention  
24 are symmetrical about the major axis, as described  
25 above.

26

27 In use, the exercise device is intended to be held in the  
28 hand and repetitively squeezed and released. To  
29 illustrate this mode of use, the preferred embodiment of  
30 the exercise device is illustrated in Figure 2 as held  
31 in a human hand 18. As can be seen from this figure, the  
32 second finger 22 generally curves around the exercise



device in an area which is near its maximum circumference around the device. Similarly, the first finger 24 curves around the larger end of the device permitting the thumb 26 to extend over the end. Similarly, the ring finger 28 and the little finger 30 curve around the end portion having a smaller diameter. Additionally, it should be noted that the central portion of the exercise device is positioned in the palm of the hand. This being the case, the generally egg-shaped outer surface of the exercise device is particularly advantageous in that it complements the natural shape of the human hand permitting all portions of the hand to be conveniently exercised by alternately squeezing and releasing the device.

Figure 3 is a cross-section of the Exercise device along a plane parallel to the major axis 12. In the preferred embodiment, the exercise device includes an inner portion 34 of material such as rubber and an outer layer 36 which is preferably soft and fibrous, leading to a device which is aesthetically pleasing and comfortable to use. The relative dimensions can be changed to increase the elongation of the device. Such a structure can be conveniently formed by simply molding the inner body of the desired material and then applying conventional flocking to the exterior surface.

The exercise device which is the subject of this invention can be easily varied for individuals having varying degrees of physical strength as well as physical

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03 size. To conform to human hands of various sizes, it is  
04 simply necessary to form the egg-shaped bodies such that  
05 it is smaller or larger as desired. The elasticity  
06 constant of the material can be varied to change the  
07 rigidity of the device. Additionally, the device may be  
08 made in various colors to specifically appeal to  
09 individuals of varying taste. Promotional messages may  
10 be printed on the exterior surface permitting the device  
11 to be used as a promotional device for various  
12 businesses.

13

14 The invention has been described above with reference to  
15 a preferred embodiment; however, it will be appreciated  
16 by those skilled in the art that many variations of the  
17 basic invention can be made, all of which are within the  
18 concept of the invention. For example, various materials  
19 may be used to form the major body of the device and  
20 various external treatments may be utilized.  
21 Additionally, some contour modifications in the outer  
22 surface are possible; however, it is believed that the  
23 smooth continuously changing radius of curvature  
24 disclosed is the most efficient embodiment of the  
25 invention.

26

27 As can be seen from the above discussion, there is little  
28 or no contact between the hand and the regions of the  
29 smaller end portion near the major axis 12. This feature  
30 permits this region to have any convenient contour. Also,  
31 contact between the hand and regions of the larger end  
32 near the major axis 12 is limited to the thumb. Although

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it complicates the design, it is also possible to incorporate indentations in the larger end which complement the thumb. Additionally, the contour of the central portions may be modified to include grooves for the fingers. The salient feature of all of these embodiments is to contour the outer surface of the device to complement the features of the hand, with the generally egg-shaped form believed to be the best embodiment. Advantages of the egg-shaped design include its simplicity and non-critical size. However, the size may be scaled for use by individuals ranging from children to adults. Additionally, contact between the hand and the larger end portion in a region near the major axis is primarily with the thumb. This feature also reduced the importance of the contour of the large end in regions adjacent the major axis. However, when all factors are considered, the generally egg shaped structure is the preferred embodiment of the invention.

The exercise device described above may be made using a wide variety of manufacturing processes and techniques. For example, the body may be molded of any material having suitable elastic properties. The outer surface may be coated using conventional flocking processes. Alternatively, the body may be hollow and gas filled to give it the desired elastic properties.

## Claims

1. An exercise device comprising:
  - a. a body of elastic material including a selectively curved outer surface and having a major axis and a minor axis, said major axis coinciding with the maximum cross-sectional diameter of said body of elastic material, said minor axis coinciding with the maximum cross-sectional diameter of said body of material in a plane parallel to said major axis, said body including first and second portions defined by a plane passing through said minor axis and perpendicular to said major axis, the outer surface of said first portion having a selectively varying curvature with the maximum curvature corresponding to a region adjacent said major axis, the outer surface of said second portion having a selectively changing curvature with the maximum curvature corresponding to regions adjacent said major axis, the maximum curvature of said first and second portions being different.
2. An exercise device in accordance with Claim 1 wherein said body of elastic material is molded rubber.
3. An exercise device in accordance with Claim 2 wherein the outer surface of said body is coated with fibers.
4. An exercise device comprising:

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03 a. a body of elastic material including a curved outer  
04 surface symmetrical about its major axis and asymmetrical  
05 about its minor axis, said body including first and  
06 second generally dome-shaped portions defined by a plane  
07 passing through said minor axis and perpendicular to said  
08 major axis, selected regions of the outer curved  
09 surface of said first and second portions selectively  
10 contoured thereby rendering said body asymmetrical about  
11 said minor axis.

12

13 5. An exercise device comprising:

14 a body of elastic material including a selectively curved  
15 central portion having a circumference complementing the  
16 reach of the second finger of the human hand, a first end  
17 portion extending outwardly from said central portion and  
18 contoured to complement the first finger and thumb  
19 portion of the human hand, a second end portion also  
20 extending outwardly away from said central portion and  
21 contoured to complement the ring and little finger  
22 portion of the human hand.

23

24 6. An exercise device in accordance with Claim 5,  
25 wherein said body of elastic material includes a major  
26 and a minor axis with said body of elastic material being  
27 symmetrical about said major axis and asymmetrical about  
28 said minor axis.

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30 7. An exercise device in accordance with Claim 6 wherein  
31 said body of elastic material is coated with a fibrous  
32 material.

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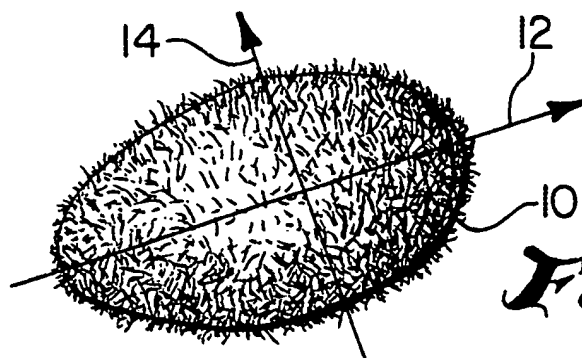
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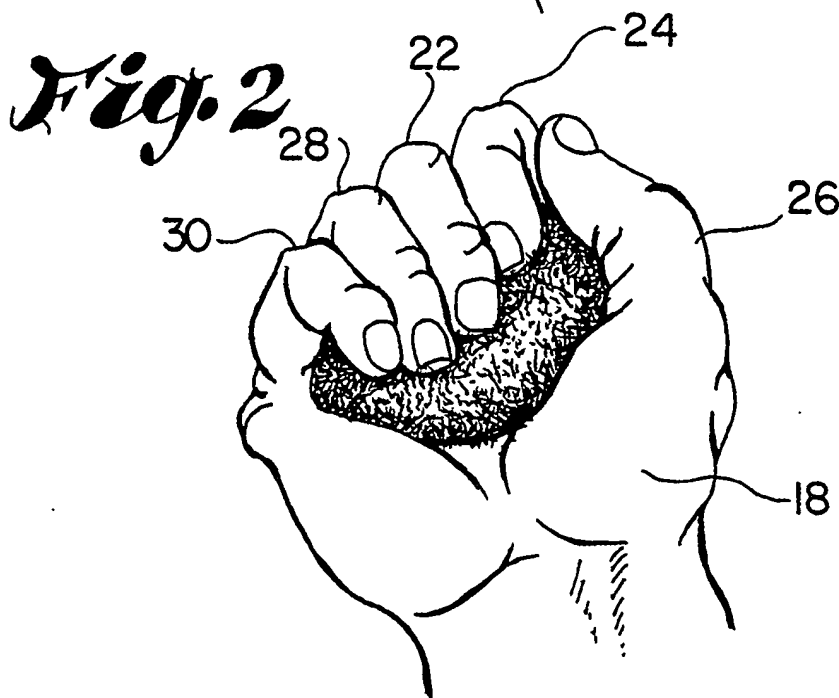
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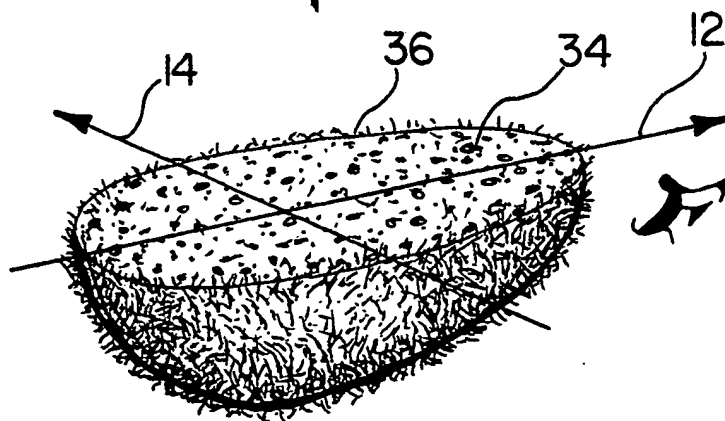
8. An exercise device in accordance with Claim 7 wherein said body of elastic material includes an interior cavity.



*Fig. 1*



*Fig. 2*



*Fig. 3*

SUBSTITUTE SHEET

# INTERNATIONAL SEARCH REPORT

International Application No PCT/US90/03815

<b>I. CLASSIFICATION OF SUBJECT MATTER</b> (If several classification symbols apply, indicate all) <sup>1</sup> According to International Patent Classification (IPC) or to both National Classification and IPC IPC(5) A63B 21/00 US CL 272/67														
<b>II. FIELDS SEARCHED</b> <div style="text-align: center; border-top: 1px solid black; border-bottom: 1px solid black; margin: 5px 0;">Minimum Documentation Searched <sup>4</sup></div> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%; border-bottom: 1px solid black;">Classification System</td> <td style="border-bottom: 1px solid black;">Classification Symbols</td> </tr> <tr> <td style="height: 40px; vertical-align: top; padding-top: 10px;">U.S.</td> <td style="vertical-align: top; padding-top: 10px;">272/67,68; 273/72R</td> </tr> </table> <div style="text-align: center; border-top: 1px solid black; border-bottom: 1px solid black; margin: 5px 0;">Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched <sup>5</sup></div>			Classification System	Classification Symbols	U.S.	272/67,68; 273/72R								
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U.S.	272/67,68; 273/72R													
<b>III. DOCUMENTS CONSIDERED TO BE RELEVANT</b> <sup>14</sup> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%; text-align: left;">Category <sup>6</sup></th> <th style="width: 60%; text-align: left;">Citation of Document, <sup>16</sup> with indication, where appropriate, of the relevant passages <sup>17</sup></th> <th style="width: 30%; text-align: left;">Relevant to Claim No. <sup>18</sup></th> </tr> </thead> <tbody> <tr> <td style="vertical-align: top;">Y</td> <td style="vertical-align: top;">US, A, 3,413,243 (GRIFFIN) 26 November 1968 See figure 1.</td> <td style="vertical-align: top;">1-4</td> </tr> <tr> <td style="vertical-align: top;">Y</td> <td style="vertical-align: top;">US, A, 3,542,363 (BISHOP) 24 November 1970 See figure 1,2.</td> <td style="vertical-align: top;">1,2,4-6</td> </tr> <tr> <td style="vertical-align: top;">Y</td> <td style="vertical-align: top;">US, A, 4,012,039 (YERKE) 15 March 1977 See figure 2.</td> <td style="vertical-align: top;">3,7</td> </tr> </tbody> </table>			Category <sup>6</sup>	Citation of Document, <sup>16</sup> with indication, where appropriate, of the relevant passages <sup>17</sup>	Relevant to Claim No. <sup>18</sup>	Y	US, A, 3,413,243 (GRIFFIN) 26 November 1968 See figure 1.	1-4	Y	US, A, 3,542,363 (BISHOP) 24 November 1970 See figure 1,2.	1,2,4-6	Y	US, A, 4,012,039 (YERKE) 15 March 1977 See figure 2.	3,7
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<div style="display: flex; justify-content: space-between;"> <div style="width: 48%;"> <p><sup>*</sup> Special categories of cited documents: <sup>15</sup></p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </div> <div style="width: 48%;"> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"Δ" document member of the same patent family</p> </div> </div>														
<b>IV. CERTIFICATION</b> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; border-bottom: 1px solid black; padding: 5px;">           Date of the Actual Completion of the International Search <sup>2</sup>             07 SEPTEMBER 1990         </td> <td style="width: 50%; border-bottom: 1px solid black; padding: 5px;">           Date of Mailing of this International Search Report <sup>3</sup>   <div style="font-size: 1.2em; font-weight: bold;">27 NOV 1990</div> </td> </tr> <tr> <td style="border-bottom: 1px solid black; padding: 5px;">           International Searching Authority <sup>1</sup>             ISA/US         </td> <td style="border-bottom: 1px solid black; padding: 5px;">           Signature of Authorized Official: NGOC-HO  <div style="text-align: center; font-weight: bold;">INTERNATIONAL DIVISION</div>           For GLENN E. RICHMAN <i>[Signature]</i> </td> </tr> </table>			Date of the Actual Completion of the International Search <sup>2</sup>  07 SEPTEMBER 1990	Date of Mailing of this International Search Report <sup>3</sup>  <div style="font-size: 1.2em; font-weight: bold;">27 NOV 1990</div>	International Searching Authority <sup>1</sup>  ISA/US	Signature of Authorized Official: NGOC-HO <div style="text-align: center; font-weight: bold;">INTERNATIONAL DIVISION</div> For GLENN E. RICHMAN <i>[Signature]</i>								
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